

REMARKS

Claims 1 to 34 are pending in the present application. Claims 1, 15, 22 and 32 are the independent claims. Claims 1, 15, 22-27, 29 and 32 were amended herein to more clearly recite the invention, in particular, to more clearly recite that the incremental files and cumulative files generated by the systems and methods of the present invention apply to a collective set of files, like a volume or partition. No new matter has been added.

In the Official Action, dated 5/19/03, claims 1-13 and 15-34 were rejected under 35 U.S.C. § 103(a) over U.S. Patent No. 6,073,128 (Pongracz et al.) in view of U.S. Patent No. 6,145,088 (Stevens). Claim 14 was rejected under 35 U.S.C. § 103(a) over Pongracz et al. in view of Stevens, and further in view of U.S. Patent No. 6,038,379 (Fletcher et al.).

Initially, Applicant would like to gratefully acknowledge the Examiner's withdrawal of the rejection to claims 1, 17, 22 and 34 under 35 U.S.C. § 112, as well as the withdrawal of the objection to claim 14, thereby advancing the prosecution of the present application and reducing the number of issues for consideration.

Summary of the Invention

At the time of Applicant's invention, there was a great need for a system that could perform off-line collection and management of backup file subsets for different types of restore operations. Advantageously, the technique of the present invention can be performed off-line for the analysis, collection and management of backup file subsets for different types of restore operations. Aspects of system restore operations are monitored and analyzed so that in response, off-line management and selection of efficient sets of backup files can be

performed to correct inefficiencies that may be detected and to efficiently tailor restore operations to the system characteristics and patterns.

The present invention thus provides a way to restore a target object such as a volume, directory or a pre-defined collection of files to a particular time by restoring the last full backup embodying the backup target, the last computed cumulative backup embodying the backup target and possibly the incremental backups after the last computed cumulative backup, if there are any that relate to change in the backup target.

For instance, in an exemplary embodiment generally corresponding to claim 1, the invention provides a method for generating backup files in a computer system including generating a full backup file corresponding to a first time for a set of objects in the computer system and generating one or more incremental files for the set of objects afterwards, *wherein the one or more incremental files each are associated with the collective set of objects*. The method further includes identifying a target object within the set of objects for the generation of cumulative backup files and then generating off-line one or more cumulative backup files corresponding to a second time (after the first time) for the target object.

Applicant respectfully submits that no prior art system relied upon in the Official Action, taken alone or in combination, teaches at least these features of the present invention.

Pongracz et al. and the Rejection under 35 U.S.C. § 103(a)

The outstanding rejections to claims 1-34 under 35 U.S.C. § 103(a) are respectfully traversed.

Applicant wishes to gratefully acknowledge the Examiner's consideration and response to Applicant's remarks submitted on April 18, 2003 on page 7 of the Official

Action. In this regard, the Examiner refers Applicant to Col. 5, lines 3-21 and Col. 5, line 60 to Col. 6, line 27 of Pongracz et al. for support for the proposition that Pongracz et al. teaches (1) generating a full backup file for a set of objects, (2) then generating incremental files(s) for the set of objects and (3) identifying a target object within the set of objects for the generation of cumulative backup file(s).

Applicant herein has amended the independent claims to more clearly recite the invention and as a result, Applicant believes the position taken in the Official Action is rendered moot. As explained below, Applicant understands Pongracz et al. merely to disclose systems and methods that operate on files individually to create a list of files for backup purposes. Pongracz et al., however, does not teach or suggest a system that creates backup, incremental and cumulative information associated with an entire collection of files, e.g., an entire volume or partition.

In reviewing the passages of Pongracz et al., Applicant wish to impress upon the Examiner that the system of Pongracz et al. discloses to build a list of backup file records of all types of backup files corresponding to the file name and resent stamp received. See Col. 3, lines 42-49 and Col. 4, line 60 to Col. 5, line 7. In short, maintaining separate backup data for each file in the file system and then scanning that list (See, e.g., Col. 5, line 60 to Col. 6, line 27) teaches the opposite of generating a full backup for the set of objects, and generating incremental and cumulative files corresponding to the collective set of objects (more than one file) as with Applicant's invention.

For instance, Applicant's system first fully backs up a set of objects (e.g., as a collective set of objects), generates incremental file(s) for the set of objects (e.g., also corresponding to the collective set of objects) and then identifies a target object from the set of objects for cumulative backups. To the contrary, Pongracz et al. discloses to Maintain

separate full backup data and incremental backup data for each file in the file system. (See also Fig. 3 of Pongracz et al. illustrating individual records for individual files separately maintained in file lists) Moreover, maintaining separate backup data for each file in a file system is just the type of resource intensive on-line operation that the invention avoids. Independent claims 15, 22 and 32 include similar limitations as claim 1, and are not taught or suggested by Pongracz et al. for similar reasons.

Accordingly, Pongracz et al. cannot be said to teach or suggest a method for generating backup files in a computer system and includes generating a full backup file for a set of objects, then generating incremental file(s) for the set of objects wherein each of the incremental file(s) is associated with the set of objects, identifying a target object within the set of objects for the generation of cumulative backup file(s) and generating those cumulative backup file(s) for the target object off-line (**claim 1**), a method for generating backup files in a computer system, comprising generating a full backup file corresponding to a first time for a set of objects in the computer system, generating incremental file(s) for the set of objects after the first time, wherein each of the incremental file(s) is associated with the set of objects, identifying a target object within the set of objects for the generation of cumulative backup files and generating cumulative backup file(s) corresponding to a second time, after the first time, for the target object, wherein generating of the cumulative backup file(s) includes analyzing incremental file(s) generated between the first and second time (**claim 15**), a computer system comprising a plurality of servers having connection(s) to a communications network and a plurality of storage components for the storage of backup information for a plurality of target objects in the form of full, incremental and cumulative backup information, wherein the incremental and cumulative backup information is associated with the collection of the plurality of target objects, wherein the full backup

information is generated at a first time and the cumulative backup information is generated at a second time, wherein the storage components are accessible over the connection(s) via the plurality of servers, wherein the cumulative backup information is generated off-line and wherein the plurality of target objects may be efficiently reconstructed to the second time associated with the cumulative backup information (**claim 22**) or a computer system comprising a plurality of servers having connection(s) to a communications network and a plurality of storage components for the storage of backup information for a plurality of target objects in the form of full, incremental and cumulative backup information, wherein the incremental and cumulative backup information is associated with the collection of the plurality of target objects, wherein the full backup information is generated at a first time and the cumulative backup information is generated at a second time, wherein the storage components are accessible over the connection(s) via the plurality of servers, wherein the plurality of target objects may be efficiently reconstructed to the second time associated with the cumulative backup information and wherein the generation of a cumulative backup file includes the analysis of incremental file(s) generated after the first time associated with the full backup information (**claim 32**).

Stevens was cited for reasons relating to off-line operation, and Fletcher et al. was cited for reasons relating to storage block mappings and formatting, but neither Stevens nor Fletcher et al. cure the above-identified deficiency of Pongracz et al. with respect to Applicant's claimed invention. Specifically, none of Pongracz et al., Stevens and Fletcher et al., taken alone or in combination, teach or suggest generating backup files in a computer system and includes generating a full backup file for a set of objects, then generating incremental file(s) for the set of objects wherein each of the incremental file(s) is associated with the set of objects, identifying a target object within the set of objects for the generation

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of cumulative backup file(s) and generating those cumulative backup file(s) for the target object off-line, as recited in claim 1, and similarly in claims 15, 22 and 32.

Claims 2-14, 16-21, 23-31 and 33-34 depend from claims 1, 15, 22 and 32, either directly or indirectly, and are believed allowable for the same reasons. Withdrawal of the rejection to claims 1-34 under 35 U.S.C. § 103(a) is respectfully requested.

CONCLUSION

Applicant believes that the present Amendment is responsive to each of the points raised by the Examiner in the Office Action, and submits that Claims 1-34 of the application are in condition for allowance. Favorable consideration and passage to issue of the application at the Examiner's earliest convenience is earnestly solicited.

Respectfully submitted,

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Thomas E. Watson
Registration No. 43,243

WOODCOCK WASHBURN LLP
One Liberty Place - 46th Floor
Philadelphia, PA 19103
(215) 568-3100